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Economic Reforms and the Poor*

by

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Abstract

This paper analyzes the effects of economic reforms for different income groups. My interest is spurred by the international debate on the social consequences of reforms and the potential adverse effects on poverty in particular. I find that the poor are in general positively affected by trade reforms, inflationary control, and structural reforms, while government consumption reduction affects the poorest income quintile negatively. In countries having undertaken World Bank financed reforms actual income of the poor was higher than predicted. Moreover, as the impact of reforms was strongest on the poor, World Bank support appears to reduce income inequality

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1. Introduction

A wave of structural adjustment programs followed the Latin American debt crisis in the early 1980s. Since then, many African and Asian countries experienced a similar process of crisis followed by structural adjustment, and many still are. Although the individual country experiences differ in many respects, the background stories appear to have much in common. Typically, large increases in public expenditure resulted in fiscal deficits. The ensuing gaps had to be closed by foreign borrowing, which in turn rendered the economies vulnerable. Exogenous shocks, such as deterioration in the terms of trade or sharply raised interest rates, subsequently precipitated serious external and internal imbalances.[1]

Against this background, it is evident that some form of external crisis lies behind the implementation of most structural adjustment programs. The immediate objective of such programs has been to address unsustainable balance of payments situations. In the longer run, however, the programs also address issues related to investment and growth, since external balances can only be maintained by sustained economic recovery.

The purpose of this paper is to analyze how economic reforms affect different income groups in the economy. My interest is spurred by the international debate on social consequences of reform and the potential adverse effects on poverty in particular.[2] The reduction of government expenditure is often one of the most important aspects of the structural adjustment process, with potentially harsh implications for the well being of the poor. Can reforms that imply laying off government employees, eliminating subsidies on staple foods, and increasing real interest rates increase poverty, while still improving overall per capita GDP levels? Or does the implementation of sound macroeconomic policies favor the poor through increasing real wages, increasing employment opportunities, and improved access to capital markets? Particularly, I am interested in the effects of World Bank supported adjustment lending that has been taking place in many developing countries since 1980. In my analysis, I will investigate whether these World Bank financed reforms have affected the

[1] In recent years, a new wave of reform programs has been undertaken under somewhat different circumstances. Several of the former communist countries of Eastern and Central Europe have undertaken structural reforms in their transition from centrally planned economies to more market oriented systems.

[2] See e.g. Jayarajah *et al*. (1996), Mohamed and Hassan (1997), and World Bank (1990 and 2000).

separate income groups in the reforming countries any differently from similar types of reforms in other countries.

Unlike some earlier research, my primary interest lies in how economic policies affect absolute poverty, i.e. the level of per capita income of the poorest population groups, over time. I also investigate how these reforms affect relative poverty, i.e. income distribution, over time. The paper primarily adds to earlier research in that it analyzes the effects of economic reforms on different income levels over time through a systematic regression analysis using panel data for 55 countries, enabling an analysis of the effects of reforms in both industrialized and developing countries.

The paper is organized as follows. In the second section I begin by describing the key characteristics of World Bank supported adjustment programs for developing countries. In the third section, I look at earlier research on poverty reduction and income inequality. The regression analysis is presented in section four, an analysis of World Bank supported reforms is conducted in section five, and my conclusions are presented in the sixth and final section of the paper.

2. World Bank Supported Adjustment

The first World Bank supported adjustment loan was signed in early 1980 and lending reached its peak in 1988 when adjustment lending constituted almost 25 per cent of the World Bank's total lending (Thomas and Chhibber, 1989). Over the past two decades, adjustment lending has accounted, on average, for at least 20 percent of total Bank lending. The objective of structural adjustment lending is to provide support for member countries experiencing serious balance of payments difficulties, or countries faced in the years ahead with the prospect of unmanageable deficits arising from external factors not likely to be easily or quickly reduced (Wright, 1980). A developing country has been shown to be more likely to take on a structural adjustment loan if it is highly indebted, when its current account deficit and debt to GDP ratio have increased and its terms of trade has deteriorated (Corbo and Rojas, 1992).

In order to qualify for World Bank supported adjustment lending, a country must be willing to adopt appropriate changes in its policies and programs. Primarily, this means reducing the current account deficit to a level corresponding to the amount of external capital that is available on a regular basis, without straining its debt servicing capacity. The loans were

originally designed to provide support for macroeconomic policy reforms, such as trade policy and agricultural reforms. Lately, the focus is more on structural, financial sector, and social policy reform, and on improving public sector resource management with the aim to promote competitive market structures (legal and regulatory reform), correct distortions in incentive regimes (taxation and trade reform), establish appropriate monitoring and safeguards (financial sector reform), create an environment conducive to private sector investment (judicial reform), encourage private sector activity (privatization and public-private partnerships), promote good governance (civil service reform), and mitigate short-term adverse effects of adjustment (establishment of social protection funds).

Several different studies have examined the effects of structural adjustment on the macroeconomy during the 1980s, although relatively less attention has been paid to the aspect of poverty. For instance, Thomas and Chhibber (1989) studied the success of structural adjustment in 30 countries that received adjustment loans from the World Bank. Experience shows that adjustment programs were generally more easily sustained when countries adjusted quickly to shocks and maintained sound policies over the long term. The negative effects of structural adjustment on growth, employment, and poverty were short-lived and domestic supply responded quickly to policy changes. The programs were adequately financed, fully backed by the government, and viewed by the general public as necessary.

In a similar study of 51 countries, McCleary (1989) found that policy changes were implemented quite successfully with regard to exchange rate management, energy policy, agricultural pricing, financial sector reforms, and the rationalization of public expenditure programs. Implementation was, however, less successful for industrial policies, tax reforms, and some aspects of public enterprise reforms.

In a later study of 220 separate structural adjustment loans financed by the World Bank, Dollar and Svensson (1998) find that the success or failure of structural adjustment is to a large extent determined by a small number of political economy variables, such as ethnic fractionalization, government crisis, democracy, and government time in power. Variables under World Bank control, such as resources devoted to project preparation and supervision or number of loan conditions, appear to have no influence on the success or failure of the adjustment program.

3. Earlier research on poverty reduction and income inequality

A few authors have made attempts at investigating the relation between economic reforms and poverty reduction. For instance, in a study by Jayarajah *et al*. (1996), the authors find that sound macroeconomic policies in reforming countries generally favored growth and poverty reduction in the period between 1980 and 1993.[3] In their comparative study, 23 out of the 53 World Bank supported adjusting countries had sufficient poverty data available for reliable before and after comparisons.[4] According to the authors, about two thirds of these countries implemented sound policies and as a consequence experienced both improved growth rates and reduced poverty in the post-adjustment period. Using ordinary least square regression analysis on cross-section data, effects on growth of macroeconomic policy performance for fiscal, monetary, and exchange rate policies were evaluated. Successful stabilization signaled that the government had both the commitment and the ability to sustain economic reforms.

In a comparative case study of the effects of adjustment on poverty in six African countries, Demery and Squire (1996) also demonstrate that poverty was more likely to decline in those countries that improved their macroeconomic balances, than in those that did not.[5] The study uses data from household surveys for the six countries at two points in time during the 1980s and the 1990s, spanning between three to eight years for the different countries. Macroeconomic policy performance is evaluated using a weighted index constructed by the World Bank (1994), where

[3] Macroeconomic policies were classified into three groups: internal balance, resource balance, and external balance.

[4] The authors use four different poverty lines (the headcount index (HDI), the poverty gap index, the squared poverty gap index, and a PPP adjusted poverty line) in testing the sensitivity of the poverty estimates to the choice of poverty lines. A relevant adjustment period was selected for each country, generally ranging from the beginning of the first loan to a year after the final disbursement. The pre-adjustment period ranges from 1970 until the year before the adjustment period, while the post-adjustment period ranges from the year after the adjustment period until 1990. See Jayarajah and Branson (1995).

[5] Poverty is here measured by the HDI, i.e. the share of the population below a predetermined poverty line. The same poverty line is not used in all countries, as the focus of the study is not to compare levels of poverty between countries, but rather changes in poverty within countries.

macroeconomic policies such as fiscal, monetary, and exchange rate policies are combined into a single index.[6]

The authors show that the link from adjustment to poverty goes through economic growth; countries that showed commitment to adjustment efforts grew faster and in turn also experienced declining levels of poverty.[7] In particular, depreciating the real effective exchange rate proved an important instrument as it benefited the poor both directly and indirectly. The authors do, however, make a particular note of the fact that the poorest of the poor have not always benefited from recent growth.

In a recent article, Garuda (2000) looks at the effects of 58 IMF supported programs on Gini coefficients and income levels of the poor in 39 countries betwen 1975 and 1991. Relative to non-program countries, the cross-country analysis reveals that income distribution as well as incomes of the poor deteriorated during economic reforms when pre-program external imbalances were severe. When external imbalances were not as serious, program countries showed relative improvements in distributional indicators.

A few other interesting studies look at how income distribution is affected by variables such as growth and other macroeconomic policy variables. Deininger and Squire (1998) use a new data set by the same authors from 1996 to examine the links between growth and income inequality. The new data set includes information on income inequality that meets minimum quality standards for 108 countries between 1960 and 1992.[8]

Looking at income growth determinants for different quintiles, in their panel data regression analysis, the authors find that investment is a positive and significant determinant for all income groups, where the poor benefit the most. They are, however, unable to establish any robust and consistent effects of either schooling, black market premium or financial development on income growth for specific quintiles and conclude that these major policy variables do not have any independent effects on the poor.

Again using the new data sets on Gini indices from Deininger and Squire (1996) for 49 countries between 1947 and 1994, Li *et al*. (1997) find support for the arguments that political freedom and capital market liberalization explain intertemporal and international variations in income inequality. In their panel regression analysis, the authors also find that capital market deepening, political freedom, and secondary education are

[6] The use as well as construction of this index has, however, been heavily criticized for its methodological and analytical shortcomings by Weeks (1997).

[7] The authors do not use the tools of formal regression analysis.

[8] These minimum quality standards are described in detail in Deininger and Squire (1996).

all positive significant explanatory variables of the income levels of both the poor and the rich.

Making use of a new expanded data set by Lundberg and Squire (1999), Dollar and Kraay (2000) find that growth in average income is translated one-for-one into growth in income of the poor. In their panel regression analysis of about 80 countries, the effects of openness, government spending, education, and capital controls are insignificant, while inflation is the only policy variable that has a negative and significant effect on income growth of the poor. Nevertheless, as the authors include average GDP growth as an explanatory variable for income growth of the poor, the policy coefficients capture only the differential impact that a particular policy has on the income of the poor. Hence, the result suggests that policies that are good for growth are equally good for the poor, although growth from different sources may have different impacts on the poor.

4. Analysis

I use the tools of panel data regression analysis to investigate the effects of reforms on different income groups. As my sample of countries not only includes World Bank financed adjusters, I am able to compare the effects of particular reforms between both specific World Bank adjusters and others.

1. The data

The data I use in the analysis of this paper are drawn from the data set on income distribution by Deininger and Squire (1996), which only includes observations with households or individuals as units of observation.[9] The data are based on representative samples covering all of the population as well as on comprehensive coverage of different income sources and population groups. Following recent literature, I compute the average income of the different population quintiles by multiplying real per capita GDP from Penn World Tables (PWT 5.6) with the quintile income share data from Deininger and Squire (1996).[10] This renders the average income of each quintile as a share of the total population. Hence, in order

[9] In order to minimize the problem of different methods being used in the original calculation of the indices, wherever needed, the authors have recalculated the Gini indices and the quintile shares using the computational tool POVCAL. See Deininger and Squire (1996).

[10] See e.g. Deininger and Squire (1998) and Li *et al*. (1997).

to get the average per capita income of each separate quintile, I multiply this figure by five. The study covers the period between 1966 and 1992 and includes 55 countries.[11] In my calculations, I only use data classified by Deininger and Squire (1996) as "high quality" data.

The raw data on quintile shares from Deininger and Squire (1996) suffer from a few inconsistencies as income shares are measured either in gross income, net income or expenditure, and the units of observation are either households or individuals. How the data classifications are distributed is described in Table 1.[12] What definitions are used could potentially affect my measure of income per capita in each quintile. Hence, in the regression analysis of the different income quintiles I introduce three separate dummy variables to account for income, gross income, and household data respectively. Distinguishing between income distribution gross or net of taxes may be of little relevance for a majority of the countries, i.e. the developing countries, where the role of redistributive taxes is quite low. Whether individual or household data are used may, however, well have a significant impact on my results.

Table 1: Classifications of income inequality data.

Household	123	Income	133	Gross	87
Personal	52	Expenditure	42	Net	44
				Undefined	2
	175	Nob	175		133

As discussed in section two, World Bank financed structural adjustment reforms typically focus on curbing inflation, reducing trade barriers, freeing controlled interest rates and prices, devaluing the nominal exchange rate, reducing the fiscal deficit by increasing revenues and decreasing expenditures, privatizing public enterprises, reducing domestic credit expansion etc. Although far from all countries covered by this study have undertaken World Bank supported programs, reforming these sectors are typically believed to have strong effects on macroeconomic performance in all countries. I will use proxies for the most common

[11] Figures for the last five year period are restricted by the lack of per capita GDP data from the PWT 5.6 after 1992.

[12] Each observation is a five year average estimate containing no data inconsistencies among the separate data points.

structural reforms as explanatory variables in the formal regression analysis presented below.

The data on policy variables are primarily data collected by Easterly *et al*. (1997). For the countries and time periods not included in their data base, I have supplemented data from the original sources. All original data sources are presented in the Appendix.

The income sample means and the standard deviations for the different quintiles in industrialized and developing countries for the period 1966-70 and 1990-92 respectively are presented in Table 2. The number of observations per country varies between one and six. As my sample includes both industrialized and developing countries, I am able to make comparisons of the effects of similar reforms in both groups.

Table 2: Average quintile per capita income (current USD).

Country group	Period		IncQ1	IncQ2	IncQ3	IncQ4	IncQ5
Developing countries	1966-70	Mean	157	275	437	702	2041
Nob	10	St. dev.	76	120	205	356	1207
	1990-92	Mean	735	1334	1949	2933	7219
Nob	15	St dev	631	1117	1599	2449	6072
Industrialized countries	1966-70	Mean	992	1892	2662	3591	5988
Nob	9	St. dev.	293	505	727	874	1500
	1990-92	Mean	5787	11106	15922	21754	35358
Nob	10	St dev	1120	1497	2155	2857	6197

2. Method

As my method of analysis, I employ a cross-country framework in which I relate countries' levels of income for each population quintile to levels of the economic policy variables over time. I estimate a regression equation based on this framework for all countries and time periods for which data are available.

There are several advantages to using panel data analysis compared to cross section or time series analysis (Baltagi, 1995, Easterly *et al*., 1997 and Hsiao, 1986). First, the question I am asking is a dynamic one: how did income levels change when policies were altered during reforms? Second, as the variables of interest change significantly over time, using time series data provide a considerable wealth of information ignored in cross-sectional data averages. Third, panel data are more informative,

offer more variability, less collinearity among the variables, more degrees of freedom, and more efficiency than cross section or time series data. Fourth, I am able to control for individual heterogeneity as the use of panel data allows me to control for both time and country specific effects.

I use five-year averages of the data in the regression analysis. Compared to using a shorter time period, I achieve a more balanced panel, as the yearly data on quintile income shares are fairly limited and unevenly distributed over time. Moreover, for the reform variables included in the analysis, short-run fluctuations can be reduced which allows me to focus on the more important medium term relationships in the economy. Using a longer time period, say of ten years, I would on the other hand loose many degrees of freedom and not be able to capture policy changes during the adjustment periods.

For each estimate of population quintile income levels, I first run ordinary least square (OLS) regressions where all coefficients are constant and the disturbance is assumed to capture differences over time and countries, then one-way fixed effect (FE) and one-way random effect (RE) models where slope coefficients are constant and the intercept varies over countries, and finally two-way FE and two-way RE models where slope coefficients are constant and the intercept varies over time and countries. In the FE models, the intercepts are assumed to be fixed like in a dummy variable model. In the RE models, the intercepts are assumed to be random leading to an error component model.[13] In order to determine which model best captures the effects of reforms on the different income levels, I examine the standard F-test, the Hausman chi-squared statistics and the Breusch and Pagan's Lagrange multiplier statistics. Only the results of the preferred models are reported in the paper.[14]

3. Income determinants

As mentioned earlier, the net effect of economic reforms on the income levels of the poor have been much debated. While poor rural producers tend to benefit from agricultural, trade, and exchange rate reforms and from a demonopolization of important commercial activities, poor consumers, on the other hand, tend to be hurt by rising food prices as price controls are abolished (World Bank, 1994). A reduction in the rate of inflation should, however, directly benefit the poor as real wages will not be eroded over time.

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[13] For a more detailed description of panel data regression models, see Baltagi (1995), Hsiao (1986) or Judge *et al.* (1984).

[14] The results of the models that are statistically inferior in this sense are available from the author upon request.

In attempts to balance the government budget, subsidies that directly benefit the poor are often eliminated or drastically reduced. Moreover, government employees generally experience a decline in real wages, so that their relative income position tends to fall. Similarly, reductions in public sector employment increases poverty and worsens income distribution, particularly when these reductions are targeted at low-level government employees (Garuda, 2000). Many adjustment programs have arguably not paid enough attention to poverty reduction and ensuring adequate provision of services to the poor. As a consequence, social cost have begun to rise (Mohamed and Hassan, 1997). Cutting spending on public health care, education, sanitation, and water supply may lead to further deterioration of already low standards.

The objective of most economic reforms is to raise overall per capita income levels rather than to redistribute income between different groups in society. This paper analyzes the effects of reforms on income levels and thus, I will also use level values of my policy variables. As for the various dimensions of economic reform, I follow Easterly *et al*. (1997) in my choice of variables.[15]

As proxies for macroeconomic stabilization, I use the average annual rate of inflation and the rate of government consumption to GDP. The proxy for financial sector reform is the traditional measure of financial deepening, i.e. the average ratio of broad money (M2) to GDP. Reform of the external sector encompasses both trade reform and liberalization of the foreign exchange market. The proxies I use for these sector reforms are the average trade share of GDP and the average black market premium respectively.[16] A proxy for "other structural reforms", such as e.g. privatization of public enterprises, resolution of debt overhang problems, and liberalization of the foreign direct investment regime is also included, measured by the average rate of investment to GDP.[17]

Easterly *et al*. (1997) think of the investment variable as capturing the effects on income through the investment channel of all reforms,

[15] Optimally, I would use reform variables that captured policy *instruments*, such as tariffs and quotas, capital constraints, measures of deregulation, privatization, tax revenues, financial sector policies etc. Due to lack of data, however, I am using proxies for these specific variables in my analysis, although I am well aware of the endogeneity problems that are involved.

[16] Using trade openness as a proxy for trade reform has recently been sharply criticized by Rodriguez and Rodrik (2000). However, lacking alternative measures, I have decide to include the variable in my analysis.

[17] Total investment is the sum of public and private investment, where private investment may be endogenous to the reform process itself. A better measure of reform would be the share of public investment to GDP. Due to lack of data for this variable before 1970, it has not been included in my analysis as the sample would be reduced considerably.

including those already in the equation. Nevertheless, as the correlation coefficients between investment and the other policy variables are quite low in this sample, this is most likely not a serious issue. See Table 3. Following the arguments of Easterly *et al*. (1997) investment could also be capturing the effects of reforms that are difficult to quantify and are not included in the regression.[18]

Presumably, the effect of a trade reform through lower tariffs should benefit all potential importers and consumers, rich as well as poor. To the extent that trade licenses and quotas are used, however, these may have a tendency to benefit the rich and powerful at the expense of the poor (Xu and Zou, 1997). Nevertheless, greater openness leads the sectors which were protected from import competition to contract. Since the poor receive a larger share of income from wages than the rich, and capital is more mobile than labor, the incomes of the poor may recover more slowly than those of the rich. Hence, the wage gap between low skilled and high skilled workers may increase in these sectors.

As suggested by the Stolper-Samuelson theory, however, trade liberalization increases the demand for goods from the sector which intensively uses the relatively abundant factor in the economy. LDCs are presumably rich in unskilled labor, whose wages should rise both relative to skilled labor within the country and to unskilled labor in the developed countries. On the other hand, this same process should lead wages for skilled labor to rise in developed countries and to fall in LDCs and the net effect on *global* income distribution is inconclusive (Lundberg and Squire, 1999).

The effect of government consumption on the poor should be positive, alleviating poverty through public spending on subsidies and health care etc, although the effect on the richer part of the population, i.e. the higher tax payers, could be negative.[19] Increased financial deepening should benefit the poor as well as the rich, although the effect may be relatively stronger for the poor when they get increased access to credit and capital markets (Li *et al*., 1997). I expect high levels of inflation to erode real wages with particular negative effects on the income of the poor. Nevertheless, high levels of inflation increase the amount of uncertainty in the economy which may reduce private investment and income levels for all groups in society. I expect the effect of the black market premium to be an indication of market imperfections (such as lack of goods and

[18] The investment variable may also be affected by exogenous factors unrelated to reform, so that one could miscalculate the effects on income levels associated with reform when investment is introduced as a reform variable.

[19] That government consumption may have a negative effect on overall economic growth has been found in several empirical studies. See e.g. Barro (1991), Easterly and Rebelo (1993), and Levine and Renelt (1992).

foreign exchange) with negative effects for all income groups.[20] The effect of total investment should be positive for all income groups.

Although I focus my analysis on the explicit effects of *economic policy* on income levels, standard economic theory predicts that non-reform variables such as those included in the augmented Solow model in the famous paper by Mankiw, Romer, and Weil (1992) (i.e. the rate of physical capital accumulation, the rate of human capital accumulation, and the population growth rate), may also affect per capita income levels.[21] Most likely due to their lack of variance over time, however, the latter two variables turn out to be insignificant in all of the separate regression analyses. As a consequence, they are omitted from the regression results presented below.[22] Likewise, incorporating a variable measuring the terms of trade generates the same lack of significant results.

Hence, I estimate the following log-linear regression model:[23]

$$INC_{jit} = a + b_1 OPEN_{it-1} + b_2 GC_{it-1} + b_3 INF_{it-1} + b_4 M2_{it-1} + b_5 INV_{it-1} + b_6 BMP_{it-1} + I_{it} + H_{it} + G_{it} + f_i + l_t + e_{it}$$

where *INC* is the log of the income level of the *j*:th population quintile in country *i* at time *t*, *OPEN* is the log of the trade share, *GC* is the log of the government consumption share, *INF* is the log of the inflation rate, *M2* is the log of financial deepening, *INV* is the log of total investment, and *BMP* is the log of the black market premium.[24] *I* is a dummy for income data, *H* is a dummy for household data, *G* is a dummy for gross income data. f is the country specific effect, l is the time specific effect, and e is the error term. As I believe that reforms generally do not affect the level of income instantaneously, I have lagged all measures of economic policy

[20] Dollar and Kraay (2000) do not find any evidence that capital account liberalization is anti-poor. In fact, their coefficient for capital controls is insignificant.

[21] The rate of physical capital accumulation is here captured by the investment variable.

[22] Omitting these variables do not particularly affect neither the levels values nor the levels of significance of the coefficients for the remaining variables. The regression results including the rate of human capital accumulation (measured by the level of secondary education) and population growth are available from the author upon request.

[23] The foremost reason I have chosen the log-linear rather than the linear model specification is that the log-linear model specification allows for easier comparisons between variable coefficients.

[24] For some countries, the black market premium is zero. Instead of excluding these observations from the analysis, I assign the logged value to –1000.

one period.[25] A correlation matrix for all lagged policy variables is presented in Table 3.

Table 3: Correlation coefficients. 175 obs.

	BMP	GC	INF	INV	M2	OPEN
BMP	1.00	-0.48	0.37	-0.24	-0.61	-0.04
GC		1.00	-0.20	0.12	0.49	0.24
INF			1.00	-0.17	-0.43	-0.16
INV				1.00	0.47	0.21
M2					1.00	0.20
OPEN						1.00

4. Results

I estimate separate regressions for the income levels of each population quintile. See Table 4. For all population quintiles, I find consistent evidence of both country and time specific effects. In all regressions, the country and time specific effects are correlated with the included explanatory variables and hence, the two-way FE models are the most appropriate. Moreover, all three dummy variables are significant in one income group or another. Hence, the dummy variables are included as control variables in all separate regressions, although they are not reported.

I find that *openness* has a positive and significant impact on all separate income groups. *Government consumption* is a positive and significant determinant of income for the poorest two income quintile as expected but has no significant effect on the other income groups. The *level of inflation* is a negative and significant determinant of income in all but the poorest and the richest two quintiles.[26] *M2* is not a significant determinant of income in any of the five separate income groups. Somewhat surprisingly, the *black market premium* is a negative and significant determinant of income only for the richest population quintiles. *Investment* is a positive and significant determinant of income in all separate quintiles as expected.

[25] I have experimented with different lag structures (no lags as well as two lags) but the above model specification has the highest explanatory power. The results from the regressions with other lag structures are available from the author upon request.

[26] The reason that inflation does not affect the income level of the poorest quintile may be that this particular group does not always participate in the monetized economy; instead people in this group often rely on subsistence farming or barter trade.

Summarizing, increasing openness and investment and lowering the rate of inflation will raise income levels of the poor. One must, however, keep in mind that the structural reforms aim at lowering government consumption, which will reduce incomes of the poorest quintile.[27] As mentioned earlier, cutting spending on public health care, education, sanitation, and water supply may lead to further deterioration of already low standards. Moreover, layoffs of government employees may add to the number of poor people as many become unemployed.

Looking at the separate income groups, openness appears to have the largest impact on the poorest income group with lower but similar effects on all the higher income quintiles. This finding implies that although increasing openness will raise income for all income groups, relative income inequality may actually fall. The coefficient for government consumption appears to be larger for the first quintile than for the second, indicating that a reduction in government consumption will increase income inequality.

Testing the magnitude of the effects of different policy reforms, I find that a one per cent increase in the investment ratio will have a significantly larger positive effect on income than a similar decrease in the rate of inflation in all of the three middle income groups.[28] The same holds true for a one percent increase in openness. In addition, the effect of a one percent increase in investment will have a significantly larger effect on income than a similar increase in openness in the third and fourth income quintiles. I cannot detect any differences between the significant policy variables for the poorer two income groups.

Using the dummy variable approach, I test for differences in the size of coefficients between LDCs and developed countries and find that the coefficient for openness is significantly higher in LDCs than in developed countries for all income groups. Moreover, the coefficient for government consumption is significantly smaller in LDCs than in developed countries in the lowest income group.

[27] Nevertheless, lowering government consumption may increase resources available for investment in productive capital. This may in turn ensure higher economic growth in the longer run, also for the poorest quintile.

[28] I use the F-test to test for differences between all significant coefficients within the separate regressions.

Table 4: One lag reform model. Dependent variable: Ave income

Quintile	*Variable*	*Coefficient*	*t-value*	*Probability*
Q1	OPEN	0.38	**2.54**	**0.01**
FE	GC	0.36	**2.00**	**0.05**
2-WAY	INF	-0.02	-0.51	0.61
Nob 175	M2	-0.03	-0.23	0.82
Adj R-squared	BMP	-0.00	-0.82	0.41
0.96	INV	0.36	**2.31**	**0.02**
	CONSTANT	3.66	4.01	0.00
Q2	OPEN	0.19	**1.86**	**0.06**
FE	GC	0.21	**1.71**	**0.09**
2-WAY	INF	-0.05	**-1.66**	**0.10**
Nob 175	M2	-0.01	-0.06	0.95
Adj R-squared	BMP	0.00	1.18	0.24
0.98	INV	0.42	**3.88**	**0.00**
	CONSTANT	5.26	8.42	0.00
Q3	OPEN	0.20	**2.10**	**0.04**
FE	GC	0.15	1.26	0.21
2-WAY	INF	-0.06	**-2.12**	**0.04**
Nob 175	M2	-0.05	-0.55	0.59
Adj R-squared	BMP	-0.00	-0.18	0.86
0.98	INV	0.46	**4.63**	**0.00**
	CONSTANT	5.73	9.84	0.00
Q4	OPEN	0.19	**2.19**	**0.03**
FE	GC	0.15	1.49	0.14
2-WAY	INF	-0.05	**-2.00**	**0.05**
Nob 175	M2	-0.07	-0.89	0.37
Adj R-squared	BMP	-0.00	-0.03	0.97
0.99	INV	0.43	**4.94**	**0.00**
	CONSTANT	6.16	12.01	0.00
Q5	OPEN	0.18	**2.18**	**0.03**
FE	GC	-0.04	-0.36	0.72
2-WAY	INF	-0.03	-1.22	0.23
Nob 175	M2	0.08	1.08	0.28
Adj R-squared	BMP	-0.00	**-1.70**	**0.09**
0.98	INV	0.37	**4.20**	**0.00**
	CONSTANT	6.64	13.09	0.00

5. World Bank supported reforms

A successfully implemented structural adjustment reform will lead to changes in the policy variables included in my regression analyses, such as increased openness, investment, and financial deepening as well as reduced government consumption, inflation, and black market premium. Taking a closer look at economic reforms during the two five-year periods of World Bank financed structural adjustment, I find that for most policy variables, level values were in general different for World Bank financed reformers and non-reformers, as can be seen in Table 5.[29] In the first reform period, the non-reforming countries had significantly higher levels of openness, government consumption, and financial deepening. In the second reform period, the non-reforming countries had significantly higher levels of investment, government consumption, and financial deepening, while their levels of inflation and black market premium were significantly lower.[30] Most of these statistical differences indicate that there was a cause for structural adjustment in these particular countries.

As can be seen in Table 6, the adjusting countries in general did not seem to undertake particularly extensive reforms compared to the rest of the world. Looking at the average change in the reform variables between 1976-80 and 1981-85, I find that openness and financial deepening were the only two variables that actually changed in the right direction. Comparing the extent of these reforms to reforms in other countries, I find that the adjusting countries on average increased financial deepening significantly more that did other countries.

In the period between 1981-85 and 1986-90, all policy variables except government consumption, which remained stable, changed in the right directions in the adjusting countries. Moreover, the extent of the reforms significantly outperformed non-adjusters for openness, the black market premium and investment.

To calculate how recent World Bank supported structural adjustment has affected income levels for the different population quintiles, I introduce a dummy variable for the reforming countries. The World Bank dummy variable is positive and statistically significant at the ten per cent level in all quintile regressions except for the richest quintile, indicating that World Bank supported reforms enhance income levels of the poor

[29] Here all policy variable averages are measured in current time, i.e. they are not lagged one period.

[30] Using the Student's t-test, I test for equality between mean level values. There were 17 reforming countries in the period between 1981-85 and 12 reforming countries in the period between 1986-90. Only seven of these countries conducted World Bank supported reforms in both periods.

majority. Moreover, the coefficient for the World Bank dummy variable appears to be increasing with falling income groups, indicating that the poorer quintiles benefit more than the rich from World Bank support and that income inequality is reduced.

The dummy variable does, however, also reflect both the fact that the countries were underperforming at the beginning of the period and that they were willing to undertake reforms. Hence, I expect it to be positive, both in support of the convergence hypothesis and because the reforms were needed and may have been undertaken even without the support of the World Bank.[31] Which factor is actually the dominating one behind the positive and significant World Bank dummy variable is difficult to determine.

Table 5: Reform averages, non-reforming and reforming countries. Actual time averages.

Country group/ Reform variable	Period		OPEN	GC	INF	M2	BMP	INV
Reforming countries	1981-1985	Mean	47.05	12.03	28.82	33.39	1.03	22.01
		St dev	23.79	3.76	36.06	15.18	3.17	6.17
Non-reforming countries	1981-1985	Mean	69.43	16.19	36.57	47.34	0.23	23.19
		St dev	59.89	5.75	121.58	20.85	0.58	7.54
Students t-test p			**0.10**	**0.01**	0.76	**0.02**	0.32	0.58
Reforming countries	1986-1990	Mean	54.68	13.11	32.52	27.79	0.85	18.04
		St dev	33.27	3.57	38.33	13.75	1.27	5.66
Non-reforming countries	1986-1990	Mean	52.29	17.73	6.54	56.48	0.04	22.12
		St dev	23.04	5.48	4.92	15.69	0.12	4.75
Students t-test p			0.84	**0.02**	**0.04**	**0.00**	**0.05**	**0.06**

[31] Contradicting these arguments, in a study of IMF programs on economic growth, Przeworski and Vreeland (2000) find that program participation lowers growth rates for as long as countries remain under a program, grow faster once they leave the program, but not faster than they would have without the program.

Table 6: Percentage change in reform variables. Based on actual time averages.

Country group/ Reform variable	Period	OPEN	GC	INF	M2	BMP	INV
Reforming countries	1976-1980 to 1981-1985	2 %	1 %	98 %	11 %	27 %	-3 %
Non-reforming Countries	1976-1980 to 1981-1985	6 %	6 %	1 %	4 %	70 %	-8 %
Reforming countries	1981-1985 to 1986-1990	19 %	0 %	-2 %	8 %	-79 %	14 %
Non-reforming countries	1981-1985 to 1986-1990	10 %	-3 %	-17 %	15 %	41 %	5 %

Finally, I calculate actual and predicted income levels for the reforming countries, presented in Table 7. Looking at the results, I find that actual income levels in the reforming countries were significantly higher than predicted for all quintiles during both reform periods.[32]

Table 7: Actual and predicted income for reforming countries 1986-90 and 1991-92.

Period	Quintile	Actual income level, logged	Predicted income level, logged	Residual	Probability
1986-90	Q1	6.64	6.35	0.28	**0.00**
	Q2	7.24	6.93	0.31	**0.00**
	Q3	7.62	7.30	0.32	**0.00**
	Q4	8.01	7.71	0.30	**0.00**
	Q5	8.87	8.57	0.29	**0.00**
1991-92	Q1	6.31	6.14	0.16	**0.04**
	Q2	6.88	6.74	0.14	**0.07**
	Q3	7.26	7.11	0.15	**0.07**
	Q4	7.65	7.50	0.14	**0.07**
	Q5	8.51	8.39	0.12	**0.10**

[32] I use the Students t-test to test if the sample means are equal for actual and predicted income levels.

Thus, I find no evidence of the potentially adverse effects of reforms on poverty in this sample of countries. Rather, I must conclude that World Bank reforms have contributed to reduced income inequality and higher income levels for the poor majority. This includes the poorest quintile and thus contradicts the findings of Demery and Squire (1996).

6. Conclusion

This paper analyses how economic reforms affect different income groups in the economy. Particularly, I look at the effects on the poor and the effects of World Bank supported adjustment lending that took place in many developing countries during the 1980s.

Comparing my findings to those of Dollar and Kraay (2000), who only present the *direct* effects of specific policies on different income groups, my results capture the total (i.e. direct plus indirect) effects.[33] Although Dollar and Kraay (2000) find that inflation is the only policy variable that has a direct effect on income of the separate groups, they make no effort to estimate the indirect effect of the specific policy variable, which is just taken as given. Hence, with the results from this study at hand, a country will be better suited to choose a pro-poor policy mix of economic reforms.

I find that reform variables such as openness, investment, inflation, and government consumption are important income determinants for the poor. Looking at the separate income groups, openness has the largest impact on the poorest income group with lower but similar effects on all the higher income quintiles. Contradicting the popular debate about how globalization is harmful for the poor, this result implies that increasing openness will both raise overall income *and* reduce income inequality. Moreover, as the effect of openness is larger in LDCs than in developed countries, increased trade may also reduce global inequality.

The coefficient for government consumption is larger for the first quintile than for the second, indicating that a reduction in government consumption may increase income inequality. The effect is, however, smaller in LDCs than in the developed countries.

Despite the heavy criticism of World Bank supported structural adjustment, I find that the World Bank financed reforms *per se* appear to have contributed to higher than predicted income levels for all groups in

[33] By direct effect, they mean the effect of a particular economic policy on income growth of a specific income group. By indirect effect, they mean the effect of an economic policy on overall growth, which in turn affects income of a specific income group.

society, including the poorest quintile. Moreover, contrary to the findings of Easterly (2000), the effect of World Bank support appears to benefit the poorer quintiles more than the rich, leading to a reduction of the income inequality. Hence, some allegations against World Bank reforms are not supported by the empirical evidence.

Appendix

Country coverage

The following is a list of countries covered in my study. My panel data set is unbalanced and I indicate for what time periods I have data, both for the dependent variable as well as for the lagged explanatory variables, in each of the 55 countries (175 observations). A star represents that the country undertook a World Bank financed structural adjustment program in the previous period.

Country	1966-70	1971-75	1976-80	1981-85	1986-90	1991-92
ALGERIA					X	
AUSTRALIA	X		X	X	X	X
BANGLADESH				X	X*	X*
BOLIVIA					X	
BRAZIL	X	X	X	X	X*	
CANADA	X	X	X	X	X	X
CHILE	X	X			X	
COLOMBIA	X	X	X		X*	X*
COSTA RICA		X	X	X	X*	
DENMARK			X	X	X	X
DOMINICAN REP.				X	X	
EL SALVADOR			X			
FINLAND	X		X	X	X	X
FRANCE			X			
GERMANY, WEST	X	X	X	X		
GHANA					X*	X*
GREECE		X		X	X	
GUATEMALA			X		X	X
HONDURAS	X					X*
HONG KONG				X	X	
INDIA	X	X	X	X	X*	X
INDONESIA			X	X	X	
IRELAND		X	X		X	
ITALY			X	X	X	X
JAMAICA		X			X*	X*
JAPAN	X	X	X	X		
JORDAN					X	
KENYA						X*
KOREA, REP.		X	X	X	X*	
MALAYSIA			X	X	X	
MAURITIUS					X*	X*
MEXICO	X	X	X	X	X*	X*
NETHERLANDS		X	X	X	X	X
NORWAY	X	X	X	X	X	X
PAKISTAN	X	X	X	X	X*	X*
PANAMA	X		X			
PERU				X	X	
PHILIPPINES		X		X	X*	
PORTUGAL		X	X		X*	

Country	1966-70	1971-75	1976-80	1981-85	1986-90	1991-92
RWANDA				X		
SENEGAL						X*
SINGAPORE					X	
SPAIN		X	X	X	X	
SRI LANKA	X	X	X	X	X	
SWEDEN	X	X	X	X	X	X
THAILAND	X	X		X	X*	X
TRINIDAD & TOBAGO				X		
TUNISIA					X*	
TURKEY	X				X*	
U.K.	X	X	X	X	X	X
U.S.A.	X	X	X	X	X	X
UGANDA						X*
VENEZUELA			X	X	X	
ZAMBIA			X			X*
ZIMBABWE					X*	

Data sources

BMP Data on black market premium are from Wood "Global Trends in Real Exchange Rates" 1960-84, World Currency Yearbook, 1985, International Currency Analysis, 1990-93 (1st choices), and for missing observations Barro & Lee (2nd choice).

GC Data on government consumption as a share of GDP come from World Bank (1st choice, 1961-93) and PWT 5.6 (2nd choice, 1950-92).

GINI Data on Gini coefficients are from Deininger and Squire (1996).

INC Data on income levels are calculated using average real per capita GDP (current international prices) from Penn World Tables 5.6 (PWT 5.6) and quintile income share data from Deininger and Squire (1996).

INF Inflation rates are calculated using CPI data from International Financial Statistics (IFS) (1st choice -93) and WDI (2nd choice, 1970-95).

INV Data on investment as a share of GDP are from the World Bank (1st choice, -93) and PWT 5.6 (2nd choice - 92).

IPCGDP Data on initial real per capita GDP (1960 international prices) are from PWT 5.6.

M2 Data on financial deepening are calculated using M2 and CPI data from IFS. Statistic is (M2/end of year CPI)/(GDP/average year CPI).

OPEN Data on imports plus exports as a share of GDP come from World Bank 1st choice, 1961-90), World Development Indicators (WDI) (2nd choice, 1970-95), and PWT 5.6 (3rd choice, 1950-92).

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